WHAT IS CLAIMED IS:

1. A semiconductor laser device with a spot-size converter, comprising at least:

a semiconductor laser region emitting light from an end facet thereof; and

a light waveguide region,

wherein the semiconductor laser region and the light waveguide region are integrated on a semiconductor substrate in a horizontal direction; and

a semiconductor layer is buried in a junction region between the semiconductor laser region and the light waveguide region.

2. A semiconductor laser device with a spot-size converter according to claim 1, wherein the refractive index of the semiconductor layer is substantially uniform.

3. A semiconductor laser device with a spot-size converter according to claim 1, wherein the refractive index of the semiconductor layer varies in a layer direction continuously or in a stepwise manner.

4. A semiconductor laser device with a spot-size converter

according to claim 3, wherein a region having the highest refractive index of the semiconductor layer is registered with a substantialy central portion of a profile of light emitted from the semiconductor laser region as well as a substantially central portion of the inherent mode of the light waveguide region.

5. A semiconductor laser device with a spot-size converter according to claim 3, wherein a second semiconductor layer is provided between the semiconduotor layer and at least one of the semiconductor laser region and the light waveguide region, the refractive index of the second semiconductor layer being substantially uniform.

6. A semiconductor laser device with a spot-size converter according to claim 3, wherein a dielectric layer is provided between the semiconductor layer and at least one of the semiconductor laser region and the light waveguide region.

7. A semiconductor laser device with a spot-size converter, comprising at least:

a semiconductor laser region emitting light from an end facet thereof; and

a light waveguide region,

wherein the semiconductor laser region and the light waveguide region are integrated on a semiconductor substrate in a horizontal direction; and

a dielectric layer is buried in a junction region between the semiconductor laser region and the light waveguide region.

8. A semiconductor laser device with a spot-size converter, comprising at least:

a semiconductor laser region emitting light from an end facet thereof; and

a semiconductor layer,

wherein the semiconductor laser region and the semiconductor layer are integrated on a semiconductor substrate in a horizontal direction; and

the refractive index of the semiconductor layer varies in a layer direction continuously or in a stepwise manner.

9. A semiconductor laser device with a spot-size converter according to claim 8, wherein a region having the highest refractive index of the semiconductor layer is registered with a substantially central portion of a profile of light

emitted from the semiconductor laser region.

10. A semiconductor laser device with a spot-size converter according to claim 8, wherein a second semiconductor layer is provided between the semiconductor layer and the semiconductor laser region, the refractive index of the second semiconductor layer being substantially uniform.

11. A semiconductor laser device with a spot-size converter according to claim 8, wherein a dielectric layer is provided between the semiconductor layer and the semiconductor laser region.

12. A method for fabricating the semiconductor laser device with a spot-size converter of claim 1 comprising at least a semiconductor laser region emitting light from an end facet thereof and a light waveguide region wherein the semiconductor laser region and the light waveguide region are integrated on a semiconductor substrate in a horizontal direction,

the method comprising the steps of:

forming a first semiconductor multilayer functioning as the semiconductor laser region on the

substrate;

removing part of the first semiconductor multilayer by etching to have a substantially vertical cross-section thereof;

forming a second semiconductor multilayer functioning as the light waveguide region in the etched region;

removing a region including an interface between a light emitting end facet of the semiconductor laser region and a light incident surface of the light waveguide region by etching to have a substantially vertical cross-section thereof; and

forming a semiconductor layer in the etched region between the semiconductor laser region and the light waveguide region.

13. A method for fabricating the semiconductor laser device with a spot-size converter of claim 8 comprising at least a semiconductor laser region emitting light from an end facet thereof and a semiconductor layer wherein the semiconductor laser region and the semiconductor layer are integrated on a semiconductor substrate in a horizontal direction,

the method comprising the steps of:

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forming a semiconductor multilayer functioning as the semiconductor laser region on the semiconductor substrate;

removing part of the semiconductor multilayer by etching to have a substantially vertical cross-section thereof; and

forming the semiconductor layer in the etched region.

14. A method for fabricating a semiconductor laser device with a spot-size converter according to claim 13, wherein a dielectric layer is formed on a side of the etched region before formation of the semiconductor layer.

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15. A method for fabricating the semiconductor laser device with a spot-size converter of claim 7 comprising at least a semiconductor laser region emitting light from an end facet thereof and a light waveguide region wherein the semiconductor laser region and the light waveguide region are integrated on a semiconductor substrate in a horizontal direction,

the method comprising the steps of:

forming a first semiconductor multilayer functioning as the semiconductor laser region on the

substrate;

removing part of the first semiconductor multilayer by etching to have a substantially vertical cross-section thereof;

forming a dielectric layer on a side of the etched region; and

forming a second semiconductor multilayer functioning as the light waveguide region in the etched region.